# Carp (Trout) Lake

Chippewa County, T44N, R06W, many sections
Carp River watershed, June-August 2019

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## Environment

Carp Lake, at one time known as Big Trout Lake, is the largest lake in the Carp River watershed. This 560-acre lake is located in the extreme southwest part of Chippewa County and lies one mile west of the village of Trout Lake (Figure 1). Various inlets enter the lake including the outlet from Little Carp Lake (Kneebone Creek) along the northeast shore and Big Ditch, Betchers and Schweinger creeks along the south shore. The outlet of Carp Lake is a channel which forms the Carp River. There is no water level control structure on the outlet.

The maximum water depth of Carp Lake is 35 feet, and a large portion of the lake is more than 20 feet deep (Figure 2). The lake is thermally stratified in the summer, with colder temperatures and lower dissolved oxygen levels in deeper water (Table 1). Substrate consists predominantly of sand in the shallower shoals and pulpy peat (organic matter) in the deeper areas. Three rock reefs covering more than 16,000 square feet exist along the north and northeast shoreline in shallow water. The reefs are made of limestone and were placed in the lake in 1974 in attempts to enhance Walleye spawning and nursery habitat. Aquatic vegetation in the lake is limited to emergent bulrush beds and various species of pondweeds and other submergents. Few limnological surveys have been made on Carp Lake in the past; limited data suggest moderate productivity which has recently declined.

The Carp Lake riparian zone is predominantly a mixture of coniferous and hardwood trees. Cottages and permanent homes are common throughout the length of the shoreline. The land around the lake is mostly privately owned, except for a small parcel of federal land and the Trout Lake Township Park on the north shore. A public boating access site is located in the township park and is managed by the Michigan Department of Natural Resources (MDNR) Parks and Recreation Division. It offers a hard-surfaced ramp with sufficient water depth to accommodate most trailerable boats. The site offers parking for approximately 30 trailers.

## History

Fisheries management began at Carp Lake in the mid-1930s when the first fish stocking efforts were initiated. Fry and fingerling Walleye were stocked nearly annually between 1934 and 1945. Early fish and aquatic community surveys soon followed in 1936 and 1947. A creel census by Law Enforcement Division personnel was made from 1949-1962.

A 1947 survey indicates Carp Lake had one hotel, 12 cottages, and three resorts along its shoreline. A thermocline was established in the lake by July. Notes from that year also indicated a strong invertebrate hatch and good spawning habitat for Northern Pike and Yellow Perch. The lack of gravel in the shoals area was believed to limit natural Walleye reproduction and abundance. Biologists used 3 gill-net lifts to sample the fish population and collected White Suckers, Northern Pike, Rock Bass, Walleye, and Yellow Perch.

Michigan Department of Conservation (MDOC, the predecessor to MDNR) personnel began stocking Bluegill and Largemouth Bass fingerlings in Carp Lake by 1948. Fish observations and seining surveys at 12 locations occurred in September 1948 to evaluate these stocking efforts. Species collected included Yellow Perch, Smallmouth Bass, Rock Bass, Walleye, White Suckers, Johnny Darters, Bluntnose Minnows, and Common, Spottail, and Blackchin shiners. Stocking efforts for Bluegill and Largemouth Bass continued through 1951 since both species were absent from the previous survey.

Seining surveys continued at seven locations in Carp Lake during 1952. Species collected were similar to those found in the 1948 survey, but also included Pumpkinseed Sunfish, Blacknose Shiners, and Mimic shiners. The discontinuation of Largemouth Bass and Bluegill stocking efforts may have been based on the absence of these species in the 1952 survey following years of stocking. However, large Bluegill were documented in the angler catch in 1955. Catch reports from the lake resorts in 1955 also indicated abundant Walleye, Northern Pike, and Smallmouth Bass.

The fish community was surveyed again in 1958 by MDOC as part of a "demonstration" to lake residents. Survey effort consisted of three fyke-net lifts and one trap-net lift. The fish community was again reflective of a northern Michigan lake with panfish and Northern Pike. Angling reports at this time, however, included fewer Northern Pike than in previous surveys and more Rock Bass, Bluegill, Walleye, and Smallmouth Bass. Bluegill became established in the angler harvest while Largemouth Bass remained absent from angler catches.

Through the early to mid-1960s, anglers reported successful fishing trips for Walleye and Yellow Perch in Carp Lake. Northern Pike were abundant, yet most fish were less than 20 inches in length, which was the minimum size limit at the time. Efforts were made by the MDNR to trap adult pike in 1963 and 1964 and transfer them to spawning ditches connected to marshes at the south end of the lake. Fingerling production, however, was met with limited success due to the low water levels available to fry and fingerling pike in the marshes. Local residents and fisheries officials during this time became interested in controlling water levels in Carp Lake. Both parties felt that a control structure at the river outlet would stabilize lake levels, and managers and lake residents also considered some type of control structure on the pike spawning tributaries near the south end of the lake. Neither structure was established due to financial limitations.

Another fish and habitat survey was made at Carp Lake by MDNR personnel in 1967. The lake was found to be thermally stratified by early July. The fish survey was completed in the end of summer 1967, with effort consisting of seining and experimental gill-net lifts. The fish community was similar to that found in previous surveys. Anglers continued to report good Walleye fishing during this time.

A historical summary of fish management at Carp Lake was made by the MDNR in 1971 following another fish and habitat survey. Shoreline observations documented 75 cottages along the lake as well as one hotel and four resorts. Alkalinity was 102 ppm which is typical for Michigan lakes, and dissolved oxygen was suitable for fish throughout most of the water column. Seining, gill netting, and shoreline electrofishing were used to survey the fish community in July 1971. Walleye were present, but not common, with most fish ranging in size from 10-12 inches. This species had not been stocked in Carp Lake since the 1940s, and the captured Walleye were believed to be from natural reproduction.

Northern Pike were frequently captured, with most 17-22 inches in length. Bluegill and bass were noted as scarce while other panfish were common. Perch, Walleye, and Northern Pike growth rates were all found to be below the statewide average.

Intensive Walleye management began at Carp Lake following the 1971 fish community survey. A Walleye spawning reef, consisting of an 18-inch thick layer of limestone that covered 16,280 square feet in 3 feet of water along the north shore and township park, was built in 1974. It was believed that adult Walleye would use this structure for spawning and young Walleye and other fish species would also use it for nursery habitat. In order to boost Walleye numbers, the MDNR restarted stocking efforts in 1974, which continued through 2001 (Table 2). The early Walleye stocking efforts were done mostly with fry, while small fingerlings were stocked in later years.

Four fisheries surveys were conducted at Carp Lake in the 1970s to assess the Walleye stocking efforts and reef effectiveness. Personnel from the MDNR Fisheries Division evaluated the Walleye population by shoreline electrofishing in August 1975. Sampling effort covered 1,800 feet of shoreline near the reef structure. Thirty-eight age 1-2 Walleye were collected. A similar survey covering 1,500 feet of shoreline was conducted at Carp Lake in June 1976, when 33 Walleye ranging in size from 3-8 inches were collected. Most of these fish were young-of-year (YOY, age-0) and believed to be from the spring 1976 stocking. Other species were collected along the reef in low numbers.

Fisheries managers summarized the effectiveness of the reef in 1977 following 3 years of Walleye fry stocking efforts, and found that the reef was valuable in adding diversity to the habitat as it attracted young Walleye and other sport fish (Gruhn 1977). A third survey to evaluate Walleye abundance and reef use was conducted in June 1977. Nighttime electrofishing was done along 5,000 feet of shoreline and documented abundant 4-12 inch Walleye. No legal Walleye (15 inches or greater) were collected.

Biologists surveyed the reef again in the spring of 1979 to determine if adult Walleye were using it for spawning. Only 12 ripe males were collected. The final survey in the 1970s occurred in September 1979 when nighttime electrofishing was used to evaluate Walleye abundance and growth following a decade of stocking. Walleye fishing was considered good at the time, but the survey catch consisted of 18 Walleye, all of which were less than 15 inches. Some Walleye appeared to be from non-stocked years, indicating some level of natural reproduction was occurring in Carp Lake.

In the 1980s the MDNR completed three fisheries surveys at Carp Lake. Nighttime electrofishing was done in September 1980 to evaluate Walleye use of the reef. Four sub-legal Walleye were collected, including one YOY from a non-stocked year. A similar survey was made in April 1983 along the reef. Effort was limited by one working electrode on the electrofishing boat, and six Walleye ranging in length from 5-17 inches were captured.

A fish community survey was completed at Carp Lake in June 1983. Sampling gear and effort consisted of trap nets, fyke nets, gill nets, and seines set over a course of 5 days. Emphasis was still on the Walleye community and previous stocking efforts. Walleye catch and size were deemed acceptable with fish ranging in size from 11-22 inches, and a larger proportion of adults in the catch compared to previous surveys. As a result, fisheries managers recommended the continued stocking of this species. The Yellow Perch population was considered to be in good condition, with plenty of fish 10 inches and larger available to anglers. Smallmouth Bass were rare and Largemouth Bass were absent from the

catch. Northern Pike 10-22 inches were common, with most of them below the 20-inch minimum size limit. Other species present included Rock Bass, Pumpkinseed Sunfish, bullheads, White Suckers, and shiners.

A follow-up fish community survey was done 10 years later in July 1993. Effort consisted of 8 trap-net lifts, 20 fyke-net lifts, 1 gill-net lift, and 1 seine haul. Catches were somewhat lower in 1993 compared to 1983 which may be partially explained by weather conditions. Eight Walleye ranging in length from 10-15 inches were collected. Most Northern Pike were in the 16-23 inch size range and slow growing (the statewide Northern Pike minimum size limit changed to 24 inches the same year). Smallmouth Bass were present, but in low numbers. Yellow Perch, Pumpkinseed Sunfish, Rock Bass, and White Suckers were common. Fewer Yellow Perch larger than 10 inches were available to anglers compared to 1983, and most Pumpkinseed Sunfish and Rock Bass ranged from 6-8 inches in size. The MDNR further evaluated the Walleye population by nighttime electrofishing in September 1993. The sampling effort covered 0.86 miles of shoreline and a large number of Walleye (38) were collected, including many age-0 fish that were stocked earlier in the year (Table 2). Age analysis of the Walleye catch indicated that some natural reproduction was occurring in Carp Lake.

Follow-up Walleye evaluations were made at Carp Lake in 1997 and 1999. Effort each year consisted of approximately one hour of nighttime electrofishing at various parts of the lake during the fall. Seventy Walleye were collected in the 1997 evaluation, with many age-0 fish from that spring's stocking captured (Table 2). Five different age classes (ages 0-4) were noted, with good numbers of age-2 fish present in the lake. These age-2 Walleye were from the 1995 year class, which was strictly derived from natural reproduction. While the survey catch was high, the growth of Walleye in Carp Lake was 1.5 inches less than the statewide average growth of this species. High numbers of Walleye were also collected during the fall 1999 electrofishing effort, which produced 60 age-0 fish and 20 yearlings, all of which resulted from natural reproduction during years without stocking.

By the turn of the millenium, natural reproduction of Walleye was considered improving in Carp Lake and Walleye stocking efforts were discontinued following 2001. A fish community survey of Carp Lake was completed by the MDNR Fisheries Division in 2005 using Status and Trends survey protocols, which standardize effort and gear types based on lake size. Sampling occurred in June and effort consisted of 17 large-mesh fyke- net lifts, 9 large-mesh trap-net lifts, 7 experimental gill-net lifts, and 5 minnow-seine hauls. Additional effort took place in late August and included 30 minutes of boat electrofishing. Large predator fish species captured included Largemouth and Smallmouth Bass, Walleye, and Northern Pike. The panfish community was dominated by Rock Bass, Yellow Perch, and Pumpkinseed Sunfish. Growth of Walleye and Northern Pike was well below statewide average.

Since surveys of Carp Lake over the years have consistently documented slow/poor growth of the relatively abundant Northern Pike, a liberalized regulation was instituted for this species in 2013. The regulation includes no minimum size limit and a five fish daily possession limit, with no more than one fish over 24 inches. This is consistent with the regulation on neighboring Frenchman Lake, as well as other lakes throughout the state that have abundant, slow-growing Northern Pike populations.

Boat electrofishing was again used to complete a fall walleye evaluation in 2013 (Table 3), which covered 3 miles of shoreline distance during 1.23 hours of survey time. Although numbers of age-0

Walleye were lower than previous surveys, natural reproduction appeared to be consistent with all age classes of Walleye up to age 5 represented in the catch.

Since about 2017, anglers started complaining about poor fishing in Carp Lake. Members of the lake association approached MDNR Fisheries Division's Northern Lake Huron Management Unit (NLHMU) staff, inquiring about whether the MDNR could stock fish in the lake or permit them to purchase fish for stocking. In order to evaluate the need for stocking, NLHMU personnel conducted fall Walleye evaluations in 2017 and 2018 (Table 3); each of these surveys indicated consistent natural reproduction of Walleye. Although catch rates of age-0 Walleye were low in 2017 (2.2 fish/hour), they increased substantially in 2018 (19.0 fish/hour). In 2018, 10 year classes of Walleye were represented in the catch.

## Current Status

To get a better look at the overall fish community, NLHMU personnel conducted a netting survey of Carp Lake from June 17 to June 20, 2019. Survey effort consisted of 6 large-mesh trap-net lifts, 9 large-mesh fyke-net lifts, 4 small-mesh fyke-net lifts, 4 experimental gill-net lifts, and 4 seine hauls. A couple weeks later on July 1, three 10-minute nighttime boat electrofishing runs were completed. Follow-up limnology sampling was done on August 28, 2019.

A total of 1,048 fish representing 15 species were collected during the June 2019 survey (Table 4). Panfish such as Yellow Perch, Bluegill, Pumpkinseed Sunfish, and Rock Bass combined made up 47.8% of the catch by numbers and 25.4% of the catch by weight (Table 4). Yellow Perch were the most numerically abundant fish species in the survey, representing 22.8% of the catch by number but only 0.9% of the catch by weight. The next most abundant panfish species was Rock Bass, which comprised 18.9% of the numerical catch and 19.2% of the catch by weight.

The predator community was made up of Walleye, Northern Pike, and Smallmouth Bass. Walleye and Northern Pike were the main predators, making up 5.2% and 4.1% of the catch by number, and 16.6% and 14.1% of the catch by weight, respectively. Smallmouth Bass were only a minor component of the catch by number (<1%), and Largemouth Bass were absent.

Nongame fish species such as White Suckers, bullheads, and various minnows were also present. White Suckers, which provide important forage for predators, were the most abundant species by weight, making up 40.1% of the catch.

Carp Lake was thermally stratified, with the thermocline starting below 18 feet in depth, when temperature and dissolved oxygen were measured on August 28, 2019; oxygen levels declined rapidly below 20 feet (Table 1). Nutrient and chlorophyll-a levels (Table 7) were representative of a relatively unproductive lake.

## Analysis and Discussion

The overall fish community of Carp Lake continues to be remarkably stable. The only differences over time have been the continued improvement in Walleye natural reproduction, and the reappearance of Bluegill in the 2019 survey catch.

The panfish community of Carp Lake is diverse and is made up of Yellow Perch, Rock Bass, Pumpkinseed Sunfish, and Bluegill. Panfish growth and size structure have been similar through the years, with most species growing at or above the statewide average. Yellow Perch up to 8 inches were present, but most of the catch was less than 3 inches long (Table 5). Perch growth was acceptable, with mean lengths-at-age similar to previous surveys (Table 6). Bluegill and Pumpkinseed Sunfish up to 9 inches in length were present, but both at low numbers. Pumpkinseed Sunfish were growing well, with a growth index 1.6 inches higher than the statewide average and greater mean lengths-at-age than previous surveys (Table 6). The panfish community in 2019 was stable or slightly improved since the 2005 survey, with Pumpkinseed Sunfish more abundant and Bluegill present after being absent from the previous survey's catch.

The predator community of Carp Lake is comprised of Walleye, Northern Pike, and Smallmouth Bass. Walleye were growing slower than the statewide average (Table 4) and were present in lengths up to 31 inches. Natural reproduction is consistent, with Walleye from all age classes 1-13 represented. Walleye stocking in Carp Lake was discontinued in early 2001 (Table 2) due to large increases in naturally-reproduced Walleye. Northern Pike from 15 to 25 inches in total length were present, and their growth was slow as well (tables 4 and 5). The forage fish community is comprised mostly of White Suckers and panfish along with some minnow species.

Water chemistry values for total phosphorus and chlorophyll-a in 2019 are low, indicating that Carp Lake is oligotrophic (Table 7). In 2005 the lake was classified as mesotrophic with low to moderate nutrient levels (Cwalinski 2005). Productivity has decreased since the lake was colonized by Zebra Mussels, which effectively filter out many of the nutrients in the water, around 2011 or 2012. Total phosphorus, an indicator of productivity, decreased by an order of magnitude from 2005 when it was 0.024 mg/L to 2019 when it was 0.0071 mg/L.

## Management Direction

1. Natural reproduction of Walleye in Carp Lake is consistent. Stocking additional Walleye or other predators is not recommended since it would slow growth rates.

2. Stocking of panfish in Carp Lake is not recommended. The panfish community is diverse, and although numbers are low, these species are prolific spawners and are usually able to populate the lake to carrying capacity on their own.

3. Maintain the existing regulation for Northern Pike (no minimum size limit and a five fish daily possession limit, with no more than one fish over 24 inches). Pike growth continues to be slow, and they are not reaching the 24-inch minimum length of the statewide regulation.

4. The remaining riparian wetlands adjacent to Carp Lake are critically important to the health of the fish community. These wetlands should be preserved and protected for the purpose of maintaining water quality and providing critical fish spawning habitat.

## References

Cwalinski, T.A. 2005. Carp (Trout) Lake status of the fishery resource report. Michigan Department of Natural Resources Status of the Fishery Resource Report 2005-15. Online: https://www.michigan.gov/documents/2005-15CarpTroutLake_158916_7.pdf. Accessed May 2020.

Gruhn, B. 1977. Preliminary observations of the artificial walleye spawning reef in Carp Lake, Chippewa County. Michigan Department of Natural Resources Fisheries Division Technical Report. Ann Arbor, Michigan.

Schneider, James C. (ed.) 2000. Manual of fisheries survey methods II: with periodic updates. Michigan Department of Natural Resources, Fisheries Special Report 25, Ann Arbor.

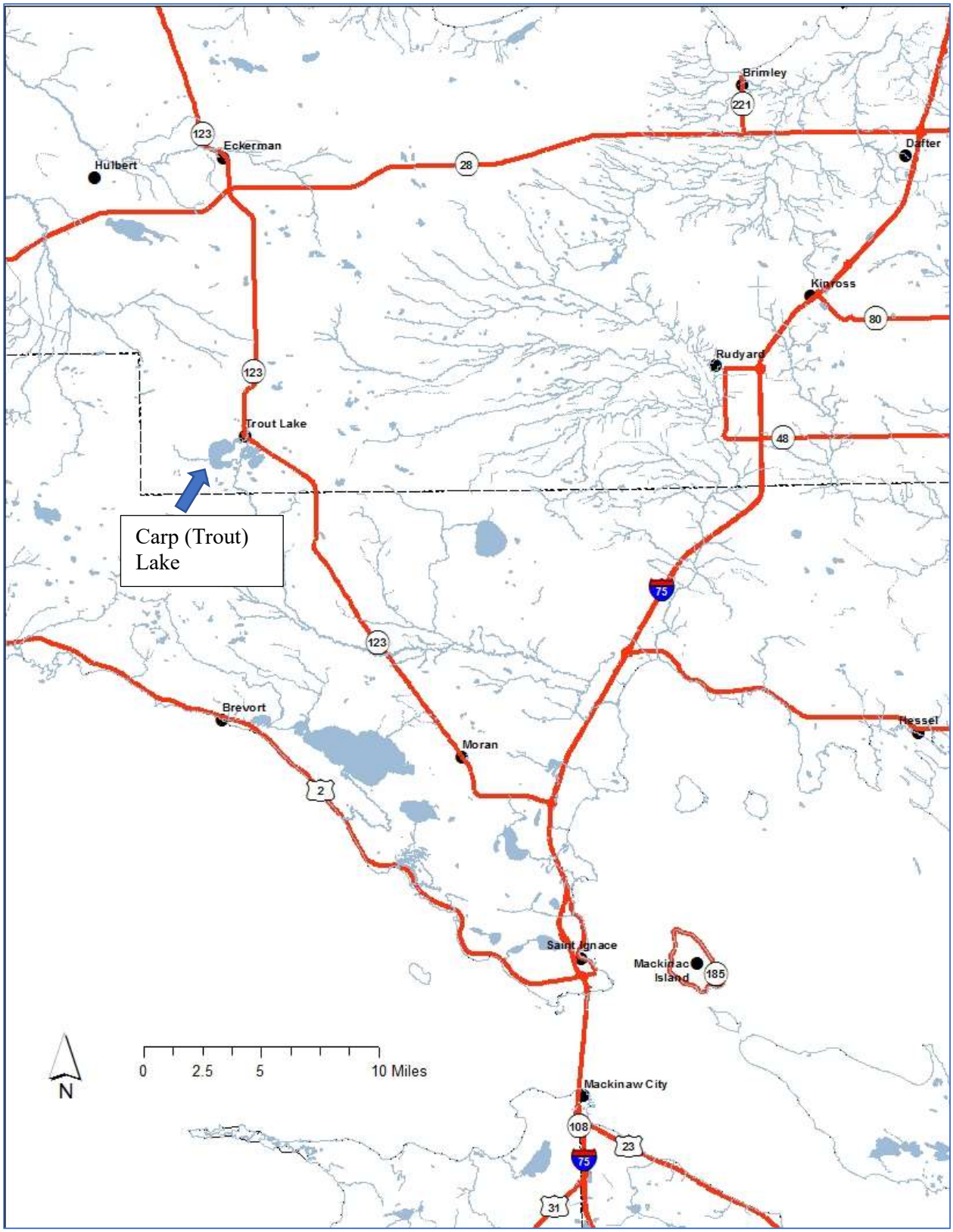


Figure 1. Carp (Trout) Lake locator map.

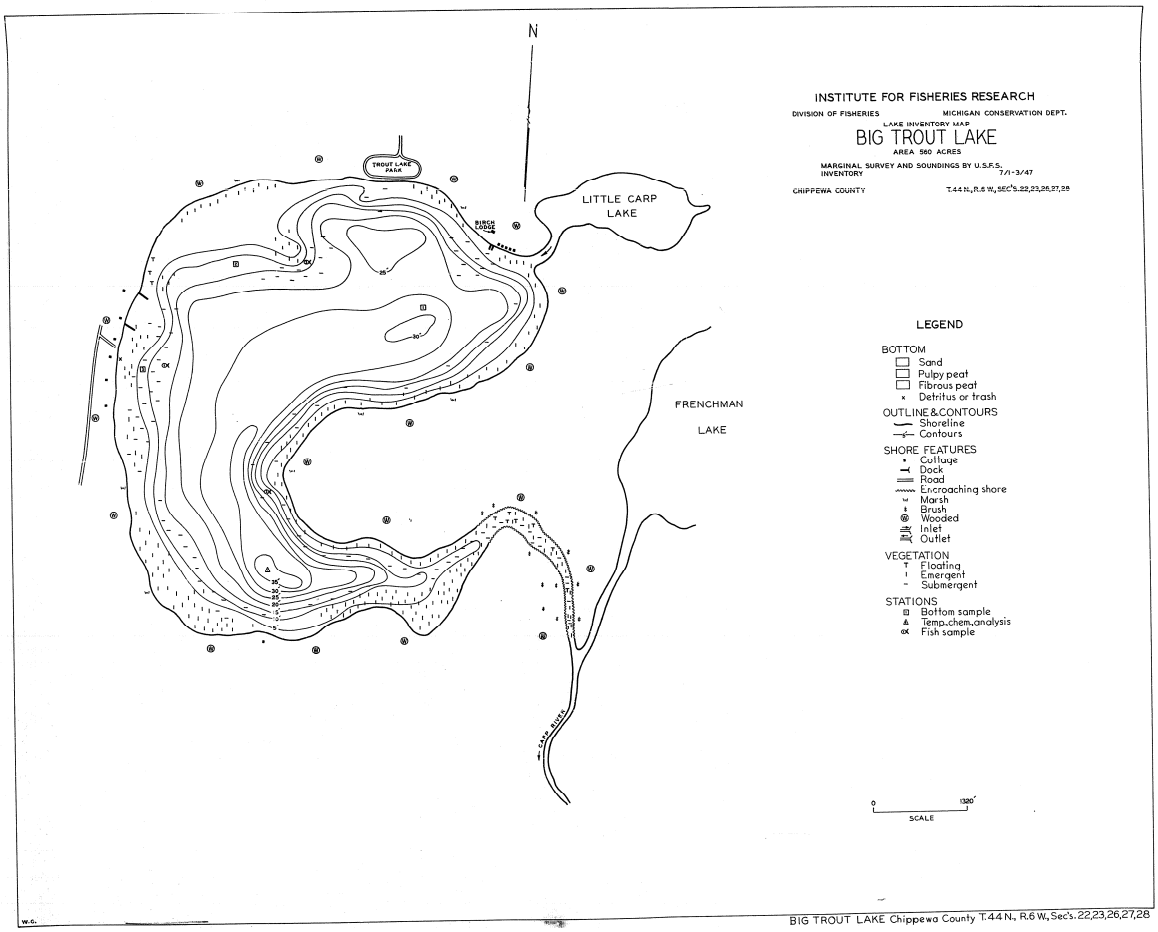


Figure 2. Bathymetry map of Carp (Trout) Lake.

Table 1. Temperature and dissolved oxygen measured along a profile of Carp (Trout) Lake on August 28, 2019.

| Reading depth | Temperature (°F) | Dissolved Oxygen (mg/L) |
|---|---|---|
| 0 | 67.4 | 8.10 |
| 2 | 67.4 | 8.10 |
| 4 | 67.4 | 8.00 |
| 6 | 67.4 | 8.10 |
| 8 | 67.4 | 8.00 |
| 10 | 67.4 | 8.00 |
| 12 | 67.4 | 8.00 |
| 14 | 67.4 | 8.00 |
| 16 | 67.2 | 7.70 |
| 18 | 67.0 | 7.40 |
| 20 | 66.3 | 6.10 |
| 22 | 65.7 | 3.30 |
| 24 | 62.0 | 0.00 |
| 26 | 61.1 | 0.00 |

Table 2. Walleye stocking history for Carp (Trout) Lake, Chippewa County, 1974-2001.

| Year | Strain | Number | Number/Acre | Avg Length (in) |
|---|---|---|---|---|
| 1974 | -- | 750,000 | 1,339 | Fry |
| 1975 | -- | 750,000 | 1,339 | Fry |
| 1975 | -- | 16,115 | 29 | 2.4 |
| 1976 | -- | 16,080 | 29 | 2.3 |
| 1977 | -- | 750,000 | 1,339 | Fry |
| 1977 | -- | 11,054 | 20 | 2.5 |
| 1981 | -- | 9,275 | 17 | -- |
| 1982 | -- | 9,582 | 17 | -- |
| 1983 | -- | 1,497 | 3 | -- |
| 1984 | -- | 9,582 | 17 | -- |
| 1985 | Manistique | 23,125 | 41 | 2.1 |
| 1987 | -- | 15,820 | 28 | 2.0 |
| 1990 | Bay De Noc | 15,192 | 27 | 1.5 |
| 1993 | Bay De Noc | 11,215 | 20 | 2.1 |
| 1996 | Bay De Noc | 11,200 | 20 | 1.5 |
| 1997 | Bay De Noc | 8,134 | 15 | 2.1 |
| 2000 | Bay De Noc | 8,484 | 15 | 1.9 |
| 2001 | Bay De Noc | 11,442 | 20 | 1.6 |

Table 3. Date, effort (hours and miles as reported), and catch rates for fall walleye evaluations in Carp (Trout) Lake, Chippewa County.

| Date | Effort (hours) | Effort (miles) | No. Age-0 Walleye | No. Age-0 Walleye/hr. | No. Age-0 Walleye/mile |
|---|---|---|---|---|---|
| 9/25/1979 | 1.42 | -- | 1 | 0.7 | -- |
| 9/18/1980 | 1.08 | -- | 2 | 1.9 | |
| 9/22/1993 | -- | 0.86 | 30 | -- | 34.9 |
| 9/22/1997 | 1.07 | -- | 50 | 46.7 | -- |
| 9/29/1999 | 0.98 | -- | 60 | 61.2 | -- |
| 9/16/2013 | 1.23 | -- | 9 | 7.3 | -- |
| 10/3/2017 | 1.85 | 4.0 | 4 | 2.2 | 1.0 |
| 9/262018 | 2.1 | 5.1 | 40 | 19.0 | 7.8 |

Table 4. Number, weight, and length by species of fish captured during the June 2019 survey of Carp (Trout) Lake, Chippewa County. *Growth index refers to the average lengths at age for that species compared to the statewide average lengths at age.

| Species | Number | Percent by Number | Weight (lb.) | Percent by Weight | Length Range (in.) | Growth Index* |
|---|---|---|---|---|---|---|
| Yellow Perch | 239 | 22.8 | 3.6 | 0.9 | 1-8 | -0.4 |
| Spottail Shiner | 223 | 21.3 | 1.1 | 0.3 | 1-3 | -- |
| Rock Bass | 198 | 18.9 | 78.2 | 19.2 | 4-10 | -- |
| Mimic Shiner | 112 | 10.7 | 0.2 | 0.1 | 1-2 | -- |
| White Sucker | 76 | 7.3 | 162.8 | 40.1 | 8-21 | -- |
| Walleye | 55 | 5.2 | 67.6 | 16.6 | 6-31 | -1.5 |
| Pumpkinseed | 49 | 4.7 | 18.4 | 4.5 | 2-9 | +1.6 |
| Northern Pike | 43 | 4.1 | 57.4 | 14.1 | 15-25 | -3.1 |
| Bluegill | 15 | 1.4 | 3.3 | 0.8 | 1-9 | -- |
| Sand Shiner | 14 | 1.3 | 0.1 | 0 | 1-2 | -- |
| Johnny Darter | 13 | 1.2 | 0 | 0 | 1-2 | -- |
| Black Bullhead | 6 | 0.6 | 5.2 | 1.3 | 8-15 | -- |
| Smallmouth Bass | 3 | 0.3 | 8.4 | 2.1 | 16-18 | -- |
| Iowa Darter | 1 | 0.1 | 0 | 0 | 1-1 | -- |
| Northern Redbelly Dace | 1 | 0.1 | 0 | 0 | 1-1 | -- |

Table 5. Number caught per inch for sport fish captured during the June 2019 survey of Carp (Trout) Lake, Chippewa County.

| Inch Group | Bluegill | Northern Pike | Pumpkin-seed | Rock Bass | Smallmouth Bass | Walleye | Yellow Perch |
|---|---|---|---|---|---|---|---|
| 1 | 3 | | | | | | 22 |
| 2 | 2 | | 1 | | | | 186 |
| 3 | | | 1 | | | | 10 |
| 4 | | | | 2 | | | 6 |
| 5 | | | 3 | 19 | | | 4 |
| 6 | 3 | | 11 | 43 | | 2 | 5 |
| 7 | 5 | | 16 | 44 | | 6 | 2 |
| 8 | | | 14 | 34 | | 2 | 4 |
| 9 | 2 | | 3 | 49 | | 1 | |
| 10 | | | | 7 | | 1 | |
| 11 | | | | | | 1 | |
| 12 | | | | | | 3 | |
| 13 | | | | | | 4 | |
| 14 | | | | | | 12 | |
| 15 | | | | | | 7 | |
| 16 | | 12 | | | 1 | 6 | |
| 17 | | 8 | | | 1 | 5 | |
| 18 | | 7 | | | 1 | 2 | |
| 19 | | 2 | | | | 1 | |
| 20 | | 4 | | | | | |
| 21 | | 2 | | | | | |
| 22 | | 1 | | | | | |
| 23 | | 1 | | | | | |
| 24 | | | | | | | |
| 25 | | 1 | | | | 1 | |
| 26 | | | | | | | |
| 27 | | | | | | | |
| 28 | | | | | | | |
| 29 | | | | | | | |
| 30 | | | | | | | |
| 31 | | | | | | 1 | |

Table 6. Comparison of mean length (inches) at age for various game fishes of Carp (Trout) Lake from 1959 to 2000. Number in parentheses represents number aged. Growth comparison was across all ages.

| Species | Age group | 1979 fall | 1980 fall | 1983 summer | 1993 summer | 1997 fall | 1999 fall | 2005 spring | 2019 spring | 2019 growth compared to state average |
|---|---|---|---|---|---|---|---|---|---|---|
| Yellow | 0 | | | 2.3 (1) | | | | -- | 2.6 (6) | -0.4 in |
| Perch | I | | | 4.0 (11) | | | | -- | 3.6 (14) | |
| | II | | | 5.4 (4) | | | | -- | 5.2 (3) | |
| | III | | | 6.5 (2) | | | | 6.2 (11) | 6.4 (5) | |
| | IV | | | 7.5 (7) | | | | 7.7 (5) | 7.5 (4) | |
| | V | | | -- | | | | 8.1 (5) | 8.4 (3) | |
| | VI | | | 9.9 (2) | | | | 8.4 (2) | | |
| | VII | | | 10.1 (2) | | | | -- | | |
| | VIII | | | 11.0 (4) | | | | -- | | |
| | IX | | | -- | | | | -- | | |
| | X | | | 12.1 (1) | | | | -- | | |
| | XI | | | 12.6 (4) | | | | -- | | |
| | | | | | | | | | | |
| Smallmouth Bass | 0 | -- | 3.3 (8) | -- | -- | | | -- | -- | |
| | I | 6.5 (2) | 6.7 (5) | -- | -- | | | -- | -- | |
| | II | -- | 8.2 (4) | 7.8 (1) | 9.5 (4) | | | -- | -- | |
| | III | -- | 10.8 (1) | -- | 12.1 (2) | | | 10.6 (5) | -- | |
| | IV | -- | -- | -- | -- | | | 12.7 (2) | 16.4 | |
| | V | -- | -- | -- | -- | -- | -- | -- | -- | |
| | VI | -- | -- | -- | -- | -- | -- | -- | -- | |
| | VII | -- | -- | -- | -- | -- | -- | -- | 17.6 (2) | |
| | | | | | | | | | | |
| Walleye | 0 | 6.3 (1) | 5.5 (2) | -- | -- | -- | -- | -- | -- | -1.5 in |
| | I | 10.4 (3) | -- | -- | -- | 8.9 (5) | 9.3 (2) | 8.3 (2) | 7.7(11) | |
| | II | 12.0 (6) | -- | 11.9 (1) | 10.9 (3) | 11.3 (10) | 10.9 (9) | 11.6 (5) | 11.1 (2) | |
| | III | 13.7 (9) | 13.8 (1) | 12.4 (1) | 14.0 (1) | 11.7 (3) | 13.8 (3) | 12.4 (8) | 13.4 (9) | |
| | IV | -- | -- | 16.0 (2) | 15.2 (4) | 15.2 (2) | 15.2 (5) | 14.0 (5) | 14.8 (7) | |
| | V | -- | -- | 17.5 (7) | -- | -- | -- | 15.8 (6) | 15.0 (6) | |
| | VI | -- | -- | 18.7 (1) | -- | -- | -- | 17.7 (3) | 15.5 (2) | |
| | VII | -- | -- | -- | -- | -- | -- | 20.4 (2) | 16.9 (4) | |
| | VIII | -- | -- | 21.9 (1) | -- | -- | -- | 18.4 (1) | 16.6 (3) | |
| | IX | -- | -- | 22.2 (1) | -- | -- | -- | 17.5 (1) | 16.4 (2) | |
| | X | -- | -- | -- | -- | -- | -- | 23.1 (1) | 18.0 (3) | |
| | XI | -- | -- | -- | -- | -- | -- | -- | 17.0 (1) | |
| | XII | -- | -- | -- | -- | -- | -- | -- | 25.2 (1) | |
| | XIII | -- | -- | -- | -- | -- | -- | -- | 31.7 (1) | |

Table 6. Cont.

| Species | Age group | 1979 fall | 1980 fall | 1983 summer | 1993 summer | 1997 fall | 1999 fall | 2005 summer | 2019 spring | 2019 growth compared to state average |
|---|---|---|---|---|---|---|---|---|---|---|
| Northern pike | I | | | 12.2 (2) | -- | | | 11.7 (9) | -- | -3.1 in |
| | II | | | 17.8 (10) | 17.7 (6) | | | 16.1 (15) | 16.5 (14) | |
| | III | | | 20.4 (6) | 20.6 (5) | | | 18.4 (11) | 18.2 (20) | |
| | IV | | | 22.0 (3) | 23.4 (2) | | | 21.8 (8) | 21.9 (4) | |
| | V | | | -- | -- | | | 24.1 (4) | -- | |
| | VI | | | -- | -- | | | -- | 21.6 (1) | |
| | VII | -- | -- | -- | -- | -- | -- | -- | 25.6 (1) | |
| | | | | | | | | | | |
| Pumpkin-seed | 0 | | | | | | | | 2.0 (1) | +1.6 |
| | I | | | | -- | | | -- | -- | |
| | II | | | | -- | | | -- | 5.8 (1) | |
| | III | | | | -- | | | 4.9 (2) | 5.6 (3) | |
| | IV | | | | 5.9 (6) | | | -- | 7.0 (16) | |
| | V | | | | 6.5 (5) | | | 7.2 (4) | 7.9 (9) | |
| | VI | | | | 6.9 (7) | | | 8.0 (1) | 8.7 (5) | |
| | VII | | | | 7.4 (5) | | | 8.4 (7) | 9.8 (1) | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| Bluegill | 0 | | | | | | | | 1.9 (3) | |
| | I | | | | | | | | -- | |
| | II | | | | | | | | -- | |
| | III | | | | | | | | 7.6 (2) | |
| | IV | | | | | | | | 6.9 (2) | |
| | V | | | | | | | | 7.9 (4) | |
| | VI | | | | | | | | -- | |
| | VII | | | | | | | | -- | |
| | VIII | | | | | | | | 9.8 (1) | |

Table 7. Water chemistry parameters for Carp (Trout) Lake from samples collected on August 28, 2019.

| Parameter | Value | Note |
|---|---|---|
| Alkalinity (mg/L) | 114 | |
| Chlorophyll a (ug/L) | 0.64 | |
| Nitrogen, ammonia (mg/L) | 0.000 | Less than the Method Detection Level of 0.04 |
| Nitrogen, nitrate + nitrite (mg/L) | 0.0068 | |
| Nitrogen, total Kjeldahl (mg/L) | 1.3650 | |
| Phosphorus, total (mg/L) | 0.0071 | |